14th June 2012

COBHAM

The most important thing we build is trust

AEROSPACE AND SECURITY DIVISION
- Aerospace Communications
- Antenna Systems
- Commercial Systems
- Tactical Communications and Surveillance

DEFENCE SYSTEMS DIVISION
- Sensor Systems

MISSION SYSTEMS DIVISION
- Aviation Services
- Life Support
- Mission Equipment

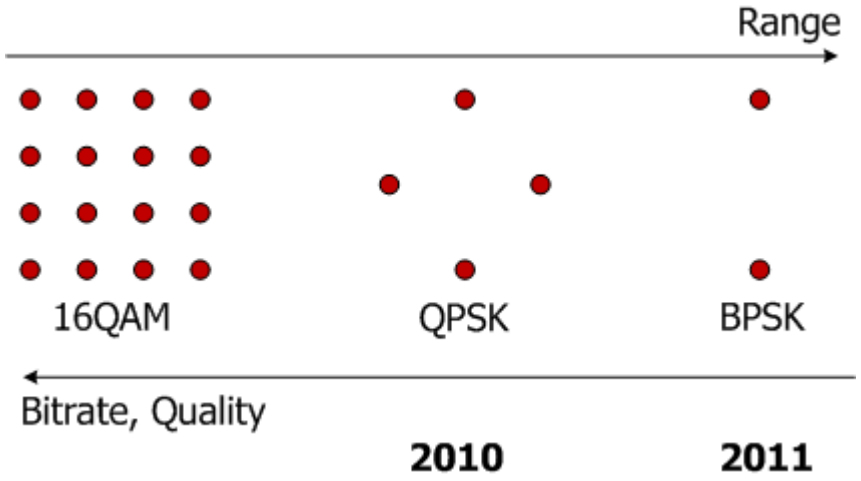
COFDM Video Product Update
COBHAM Asia VAR Conference 2012

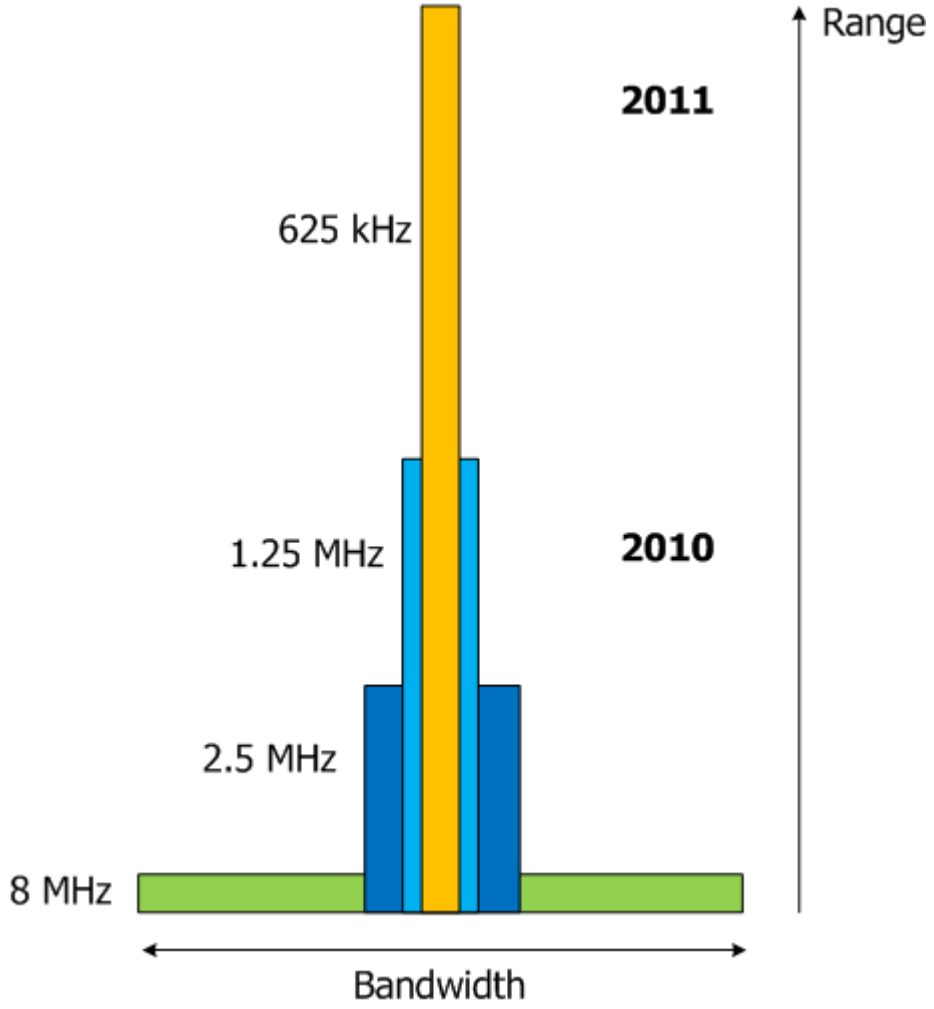
Agenda

- COFDM System Update
- Standard COFDM Receiver range
  - New Codecs and Products
  - SOL5RX and MicroVue2
  - NanoVue latest enhancements
- Transmitter range
- New Dual IP Encoder
- Mission Commander
  - Latest Release and next features
  - Nugget Updates
  - Client Server Split

COFDM Solo4 Updates (New Modulation)

- **COFDM Transmitter Options**





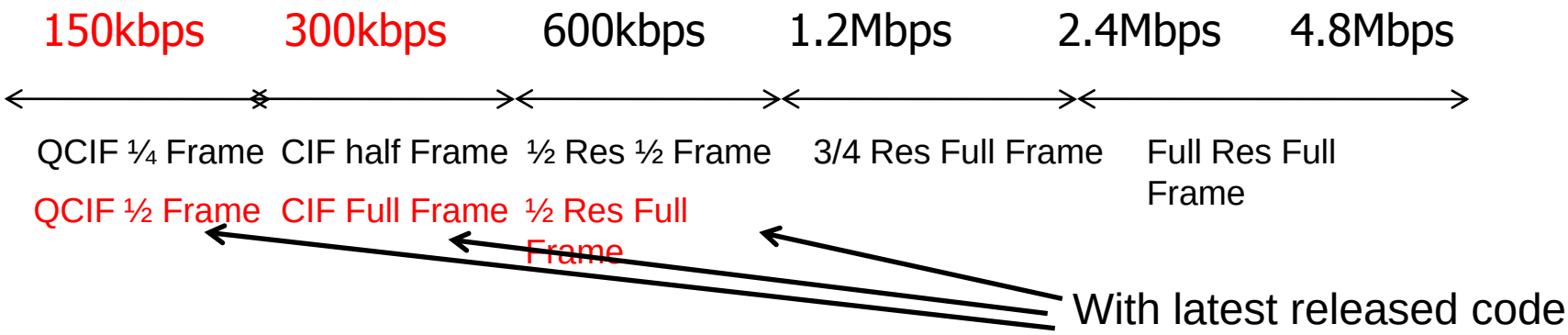
ULTRA-X modes – what might they provide

- **Advantages**
  - Greater Line-of-Sight range (6dB advantage in the new LDR mode)
  - Almost the same as a 10dB amplifier!
  - Improved non Line-of-Sight (Hard to quantify but may give an extra bounce)
  - Single transmitter now provides from 150kbps to 5Mbps optimised video

- **SOFTWARE UPGRADE FOR A NUMBER OF PRODUCTS**

ULTRA-X modes – the details

- **But you never get something for nothing!**
  - The available bit-rate for video is reduced degrading video quality



- **Receiver Filters fixed at 3MHz channelisation (existing product)**
  - Adjacent channel performance must be considered in use
- **Started NanoVue / MRRX development to add 625kHz SAW**

Solo4 (Video Enhancements)
Wider Resolution range

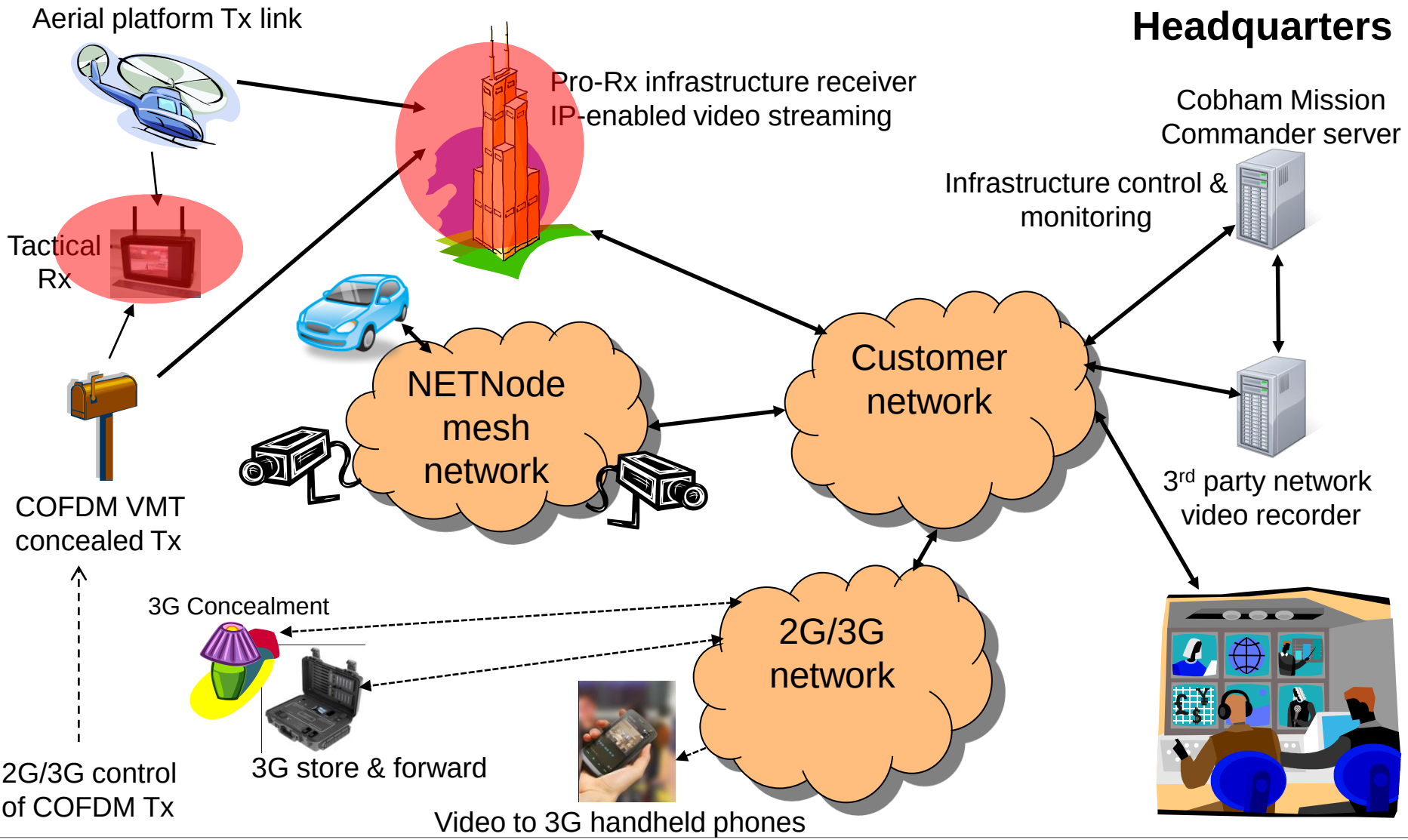
- FULL PAL (704 x 576)
- CIF PAL (352 x 288)
- QCIF PAL (176 x 144)

Applicable Products

- **Transmitters**
  - All Cobham Narrowband capable COFDM Transmitters produced since 2007 can be software updated to give the wider range of video and modulation support.
- **Receivers**
  - SOLO4RX with Issue2 D300 **(Done)**
  - MicroVue **(Done)**
  - NanoVue **(Done)**
  - Pro-RX **(Done)**
  - CRX **(Done)**
  - **All New Receivers e.g. SOLO5RX will support Ultra-X**

Integrated Surveillance Infrastructure Systems: Video systems Vision

COBHAM



Solo Infrastructure Receiver Family

SOLCRX444
4 Channel RX
4 Way diversity
Video & IP Out

Solo4
Single Channel RX
2 Way diversity
Video Out, IP options

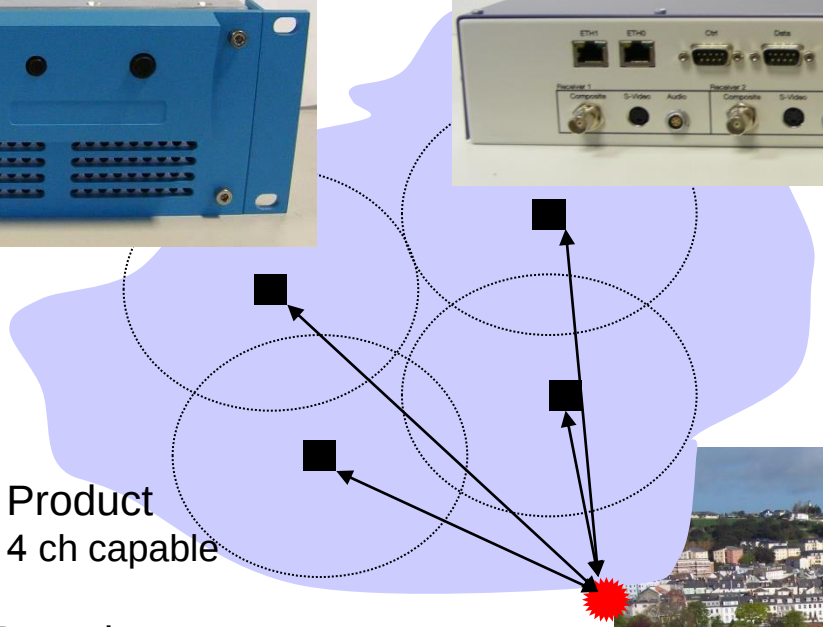
PRO-RX
1 or 2 Channel RX
4 to 8 Way diversity
Video & IP Out

MRRX
Single Channel RX
2 Way diversity
Video & IP Out

SOLCRXR444
Portable Mil Spec
4-Way antenna diversity
4 Channel COFDM RX

SOL5RX
Single Channel RX
2 Way diversity
Video & IP Out

Infrastructure Receivers and IP Streaming - Low Latency, High Security



HQ

IP Hardware Decoder Product

1U 19” rack mount, 4 ch capable

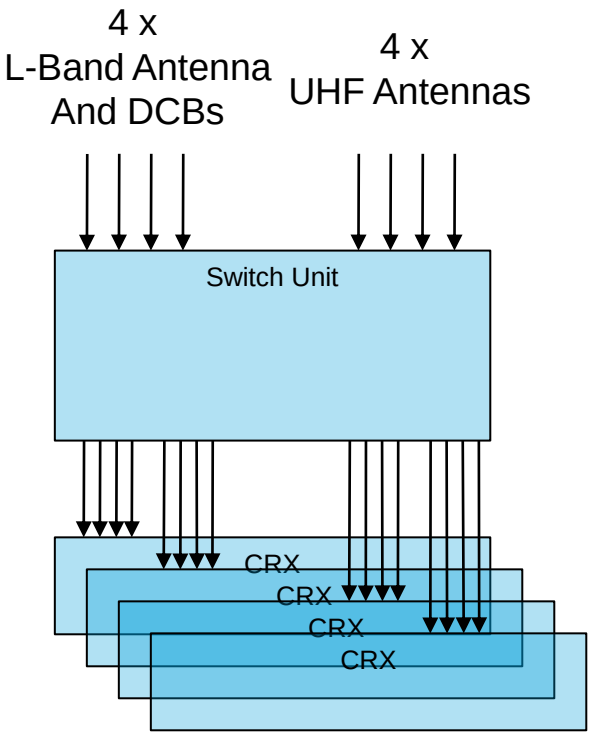
Cobham IP Software Decoder

Stand Alone Windows Application

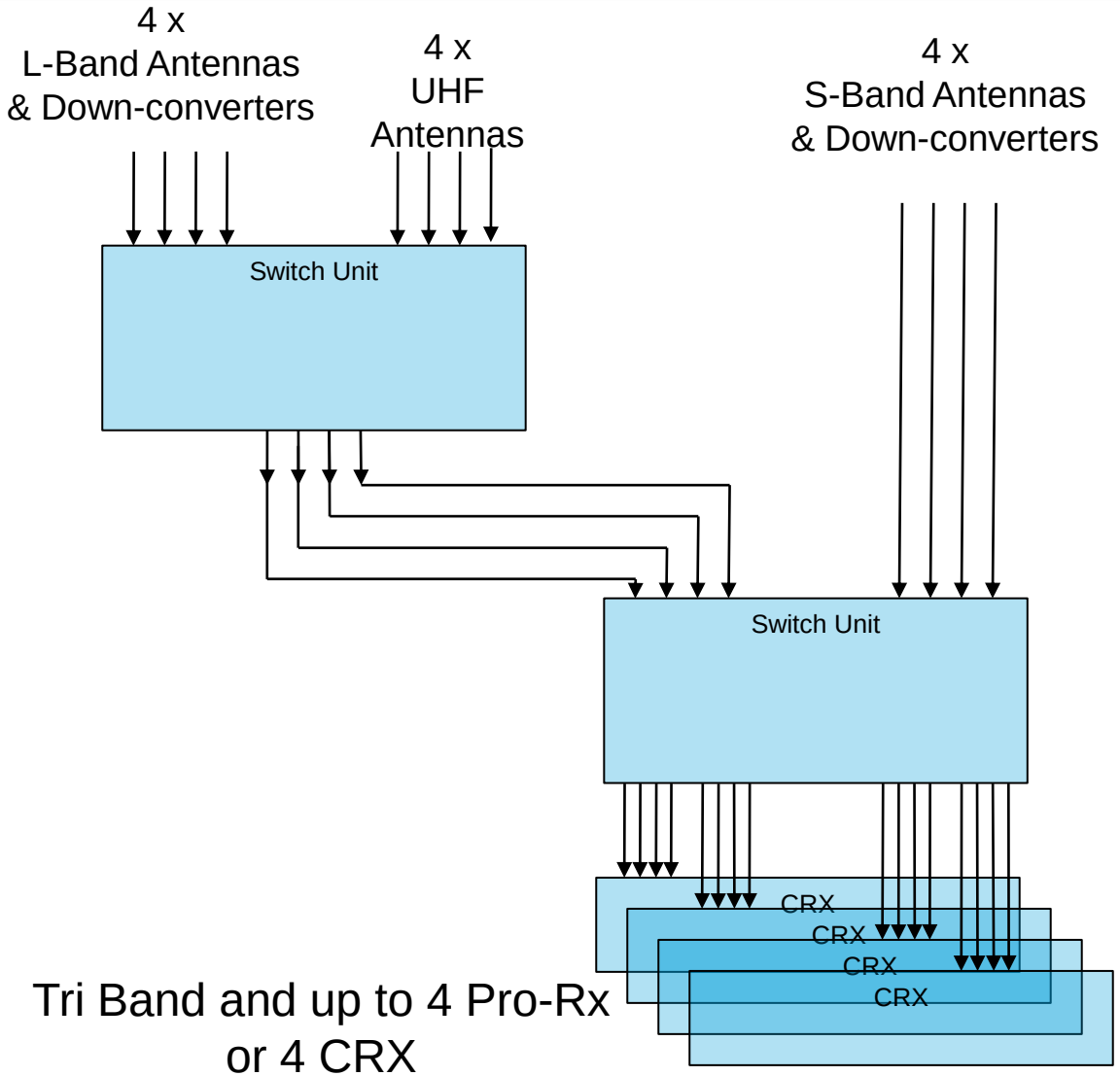
Embedded in Mission Commander Control Suite

Modified Multicast Mode – 4 streams

Antenna Switch Unit
Typical applications



Dual Band and up to 4 Pro-Rx
or 4 CRX



Tri Band and up to 4 Pro-Rx
or 4 CRX

What does the Antenna Switch Unit look like?

- Debug started April 12
- First Full Unit Oct 12

Solo Tactical Receiver Family

SOL4MUV
MultiVue
4 Channel COFDM RX

SOLCRXR444
Portable Mil Spec
4-Way antenna diversity
4 Channel COFDM RX

SOL4MIV
MicroVue
Single Channel RX
Battery & Mains powered

MRRX
One box waterproof
Single Channel RX

SOL4NNV
NanoVue
Handheld
Single Channel RX

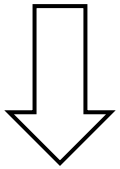
NanoVue Robust
Rugged handheld
Single Channel RX

New Video Codec Support

- New Receivers support MPEG-4, H.264 and MPEG-2
  - SOLO5RX
  - NanoVue
  - MicroVue2
  - CRX and Pro-Rx stream H.264 over IP today
- By End June Latest RX families will support
  - Standard Definition H.264 (MPEG-4 AVC)
  - We support MPEG-2 and MPEG-4 ASP today
- What does this mean for customers?
  - Better pictures at the same bit-rate as today
  - Lower bit-rate to give the same quality

Tactical Receiver Family

D350 and Twin Down Converter cards used as foundation for Tactical receivers.



NanoVue **MRRX** **Rugged NanoVue** **MicroVue2**

NanoVue – Miniature Tactical Receiver

Smallest portable tactical receiver in range
130 x 80 x 32 mm

Integral down-converters, diversity antennae mounted on unit

Fully featured 8/7/6/2.5/1.25/0.625 MHz demod

Low power
8W including screen and down converters
Flexible 6 – 16 VDC input

4.8” Video screen, capacitive touch screen

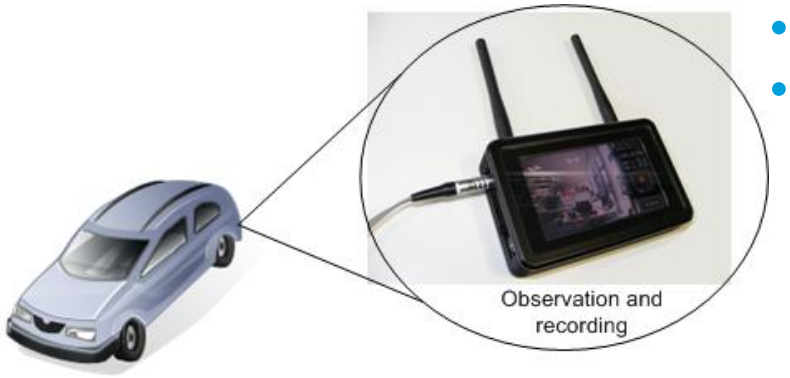
Headphone and AV out

Ethernet streaming – Multicast, RTSP

Internal recording to SD card

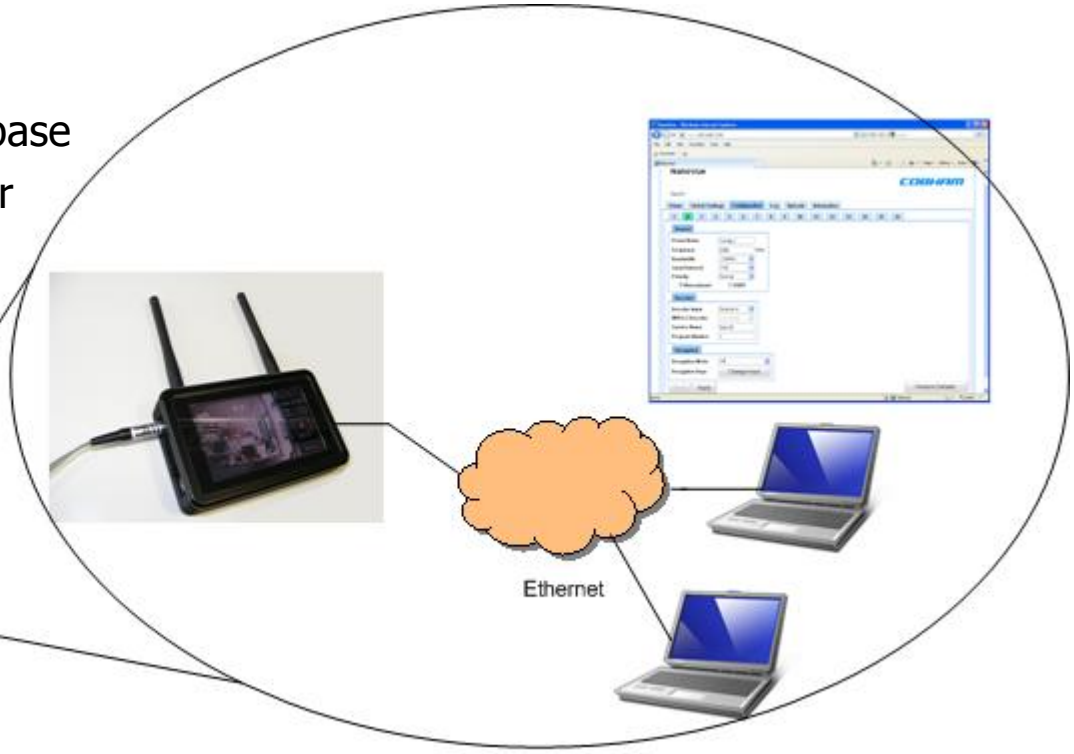
Demo today

NanoVue – Miniature Tactical Receiver



- Covert observation and recording in the field
- Touch screen for
  - Changing channel
  - Start/stop recording
  - Status information

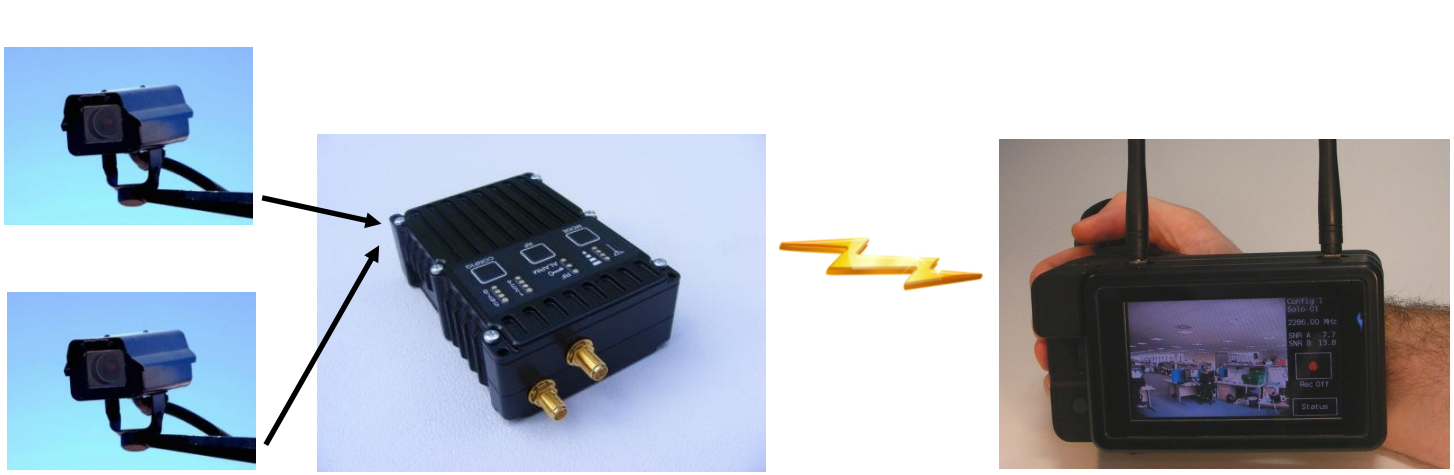
- Download and view recording and at base
- Detailed configuration via web browser
  - e.g. Encryption keys
- Mission Commander
  - Asset management
  - Frequency plans



NanoVue Phase 2 & 3 updates

- Custom battery pack released
  - Ergonomic handgrip
  - 4-5 hours battery life
  - Status indicators
  - On/Off button
  - Easy swap out
- High L-band unit added (1650-2380 MHz)
  - 340-470MHz, L-Band, S-Band & C-Band
- Recording to internal 32GB SD card added
  - Narrowband > 24 hours
  - Start/stop via touch screen or web browser
  - Playback via Mission Commander
  - Playback via RTSP in VLC media player
  - Bitrates up to 2.4Mbps (not DVB-T)

NanoVue Enhancements
All Released



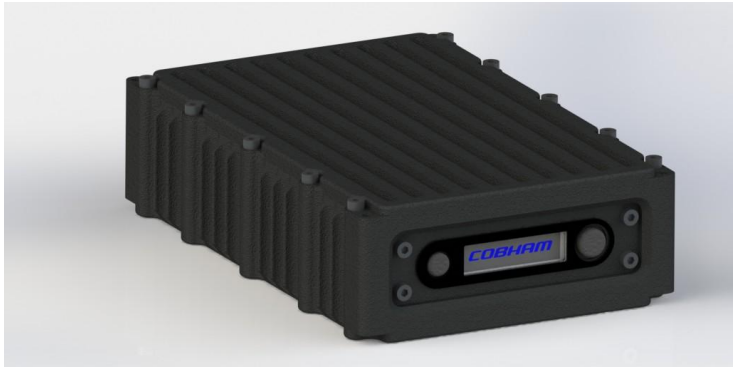
- One touch toggle between two views from a dual video Solo6
- Password protection to prevent users modifying settings
- Time and Date stamping on the PAL / NTSC output
- Frequency scanning and automatic signal detection
- Audio mute at source option via touch screen (mutes output and recordings)

NanoVue Enhancements (2)
Will be released next week

- H.264 SD support
  - Software Upgrade
  - Works in Ultra-X, Ultra-Narrowband, Narrowband and DVB-T
- IP Hardware decoder support
- Easy download of SD card recordings via Mission Commander
- Will be added with next Software Release (expected next week)

ALL OF THESE UPDATES WILL ALSO BE AVAILABLE ON SOLO5RX & MICROVUE2

New SOLO5RX Receiver

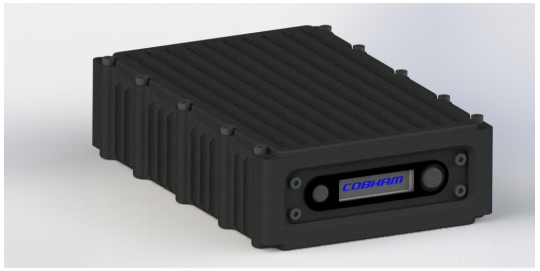


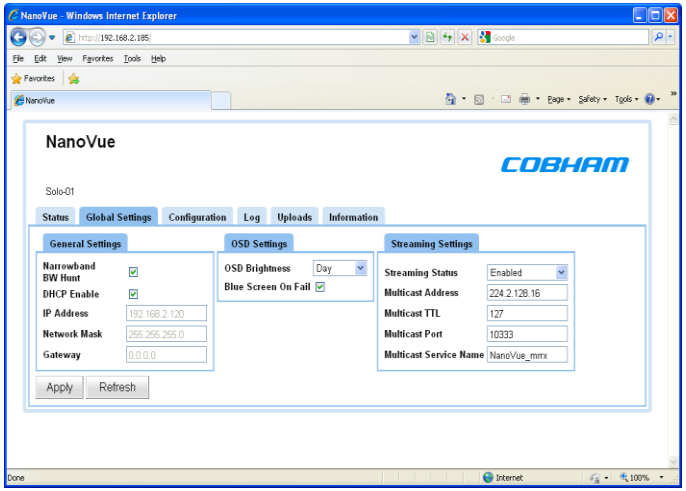
- Desktop, Concealment or Rack Mount Receiver
  - Based on NanoVue
  - OLED front panel control
  - USB, RS232 and Ethernet remote control
  - Only 145 x 95 x 40mm

- Outputs
  - Composite Video
  - IP streaming: UDP multicast, RTSP multicast or RTSP unicast

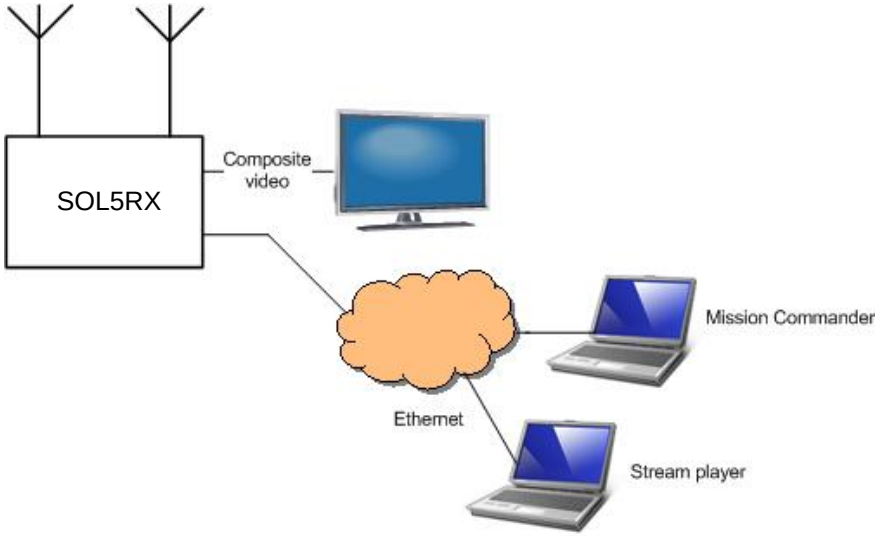
New SOLO5RX Receiver (Now in Pre-production)

- Standard Web based remote control





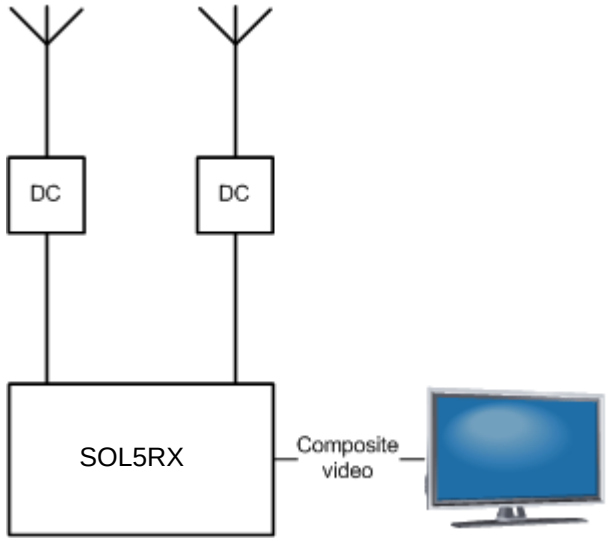
- Built in Down Converters
  - More compact solution
  - Direct connection to antennas
  - All bands supported



New SOLO5RX Receiver Frequency Variants

- Frequency Bands available at Launch
  - VHF / UHF 320 – 450 MHz
  - L-Band 1.00 – 1.50 GHz & 1.65 – 2.38 GHz
  - S-Band 2.17 – 2.55 GHz
  - 3 GHz 3.10 – 3.70 GHz
  - C-Band 4.40 – 5.00 GHz & 5.50 – 6.00 GHz

- Q4 2012 IF Model
  - Will support standard Cobham DCs
  - Integrates a VHF/UHF tuner
  - Replaces 2-way diversity Solo4 RX



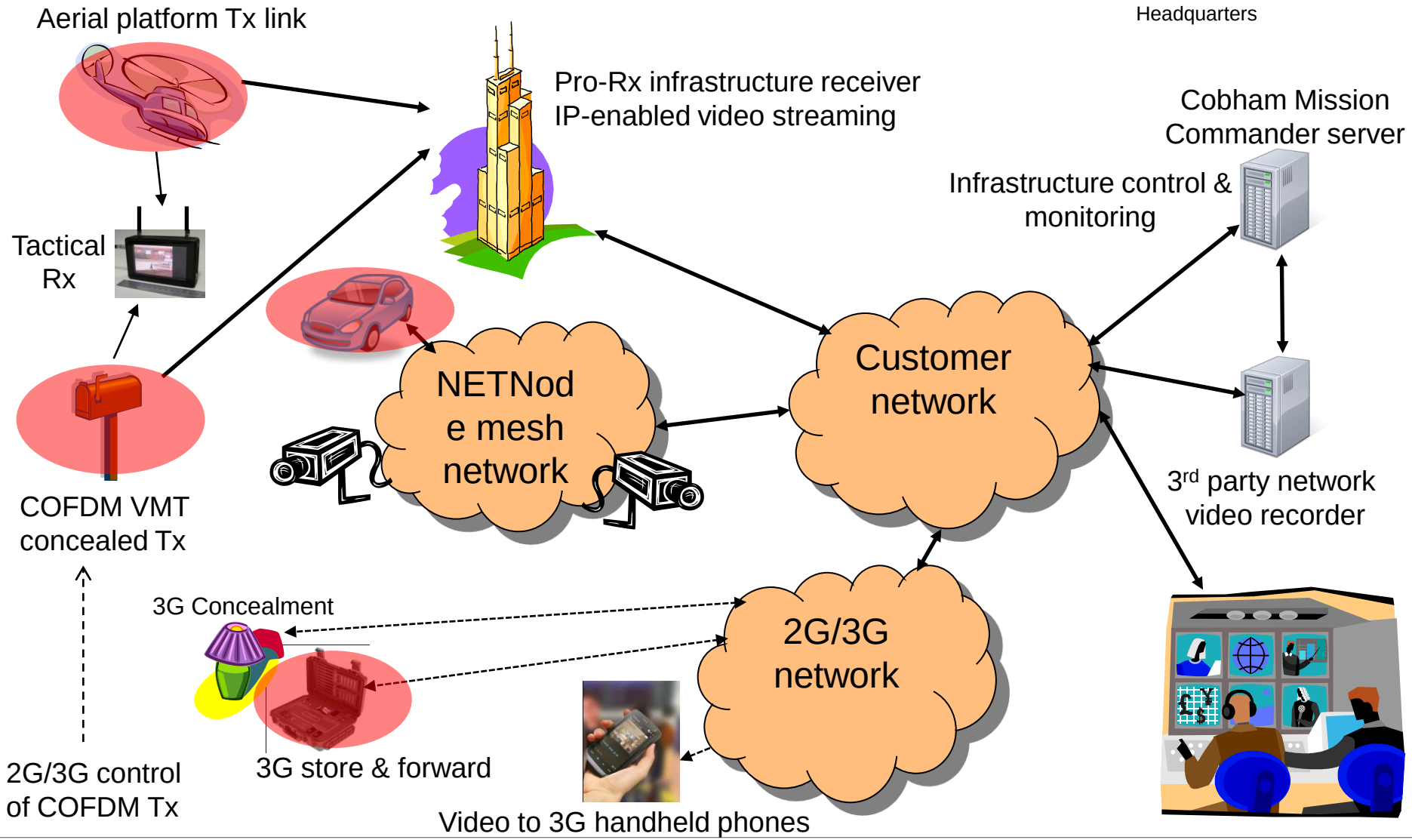
New MicroVue 2

- Update on the existing MicroVue Briefcase
- 7 to 8 hours battery life – twice as long as the current unit
- Wide ranging DC input 9v – 40V DC
- Single simplified controller
- External PSU
- In built 160GB hard disk recorder
- In built IP streaming
- Twin RF band support (one with external antennas)

New MicroVue 2

- Mobile Phone status bar
- Mobile Phone like menu structure
- Simple configuration scroll wheel

Integrated Surveillance Infrastructure Systems: Transmitters



Cobham Transmitter Family
Current Surveillance range

SOLMTX
100mW Output
4W DC power

SOL04 / SOLO5
100mW Output
1W S & L-band

SOLAMP500mW
500mW Output
9W DC power
including SOLMTX

SOL06
Twin Coder
Dual or Tri-Band
7.5W DC power

VMT
100mW Output
4W DC power
20% smaller
L and S-band only

SOLHD
High Def
High Profile
11W DC power

Output Frequencies from 300MHz to 8GHz

Robust Transmitter Product

SOL4TXR
100mW Robust TX

SOL4DCAM-P

NETLinkS
100mW COFDM TX
3G Modem, WiFi, Hard Disk storage

SOL4TXR
SOLAMPR1W
1W Robust TX

SOL4CLCP
1W PTZ COFDM

Miniature Robust Transmitter

- D55x board set repackaged into robust enclosure
- 100mW transmitter power
- Can be supplied with Robust Amp to provide 1W
- Designed to meet IP67 rating
- Operational temperature -20 to +50ºC
- UHF, L, S and C Bands
-

MRTx Product Codes

- **100mW MRTx**
  - MRTX-030045
  - MRTX-100150
  - MRTX-165250
  - MRTX-300370
  - MRTX-440500

1W MRTx

- MRTX1W-030045
- MRTX1W-100150
- MRTX1W-165250
- MRTX1W-440500

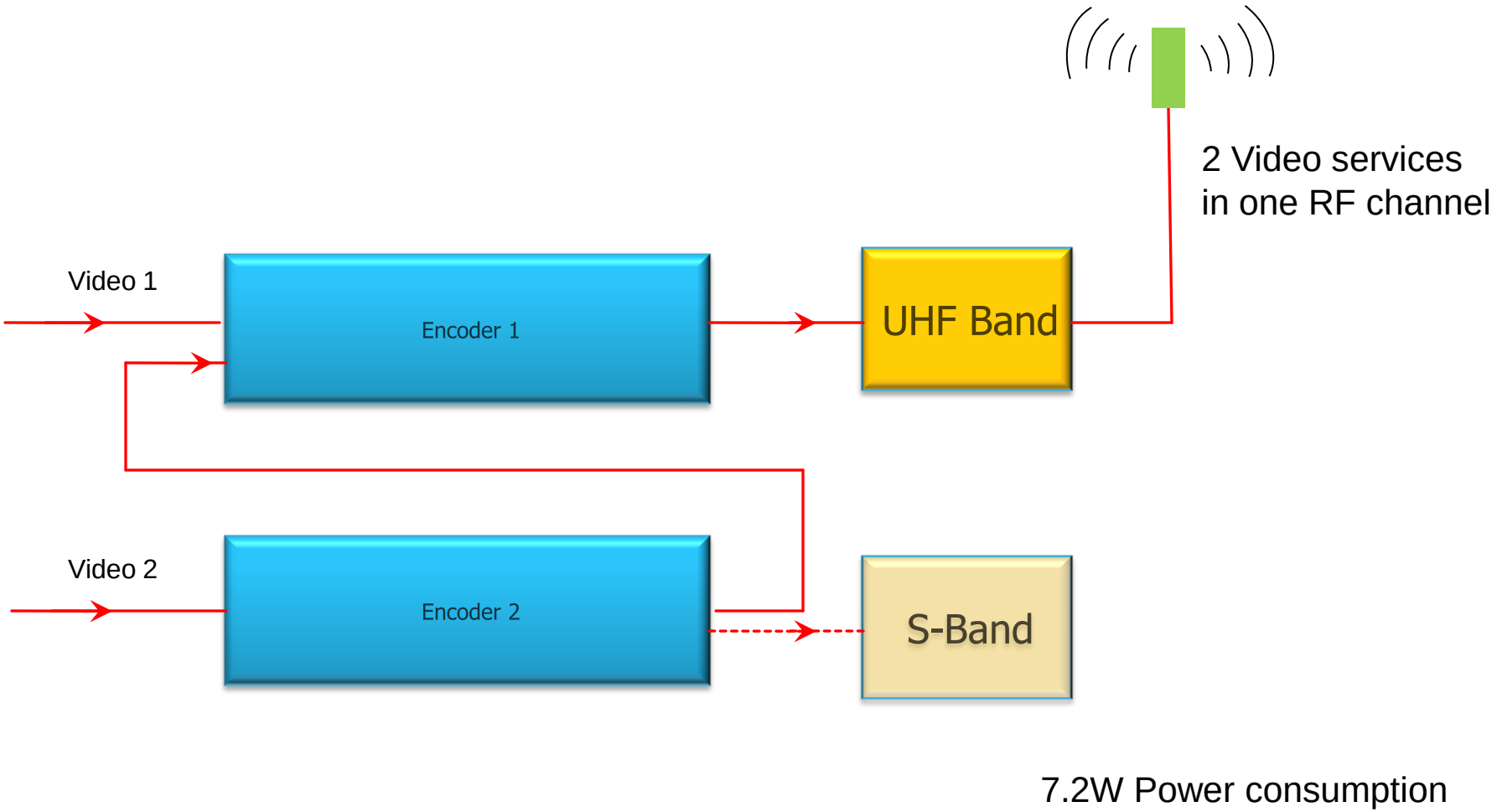
1W Amplifiers

- SOLAMPR1W-100150
- SOLAMPR1W-200250
- SOLAMPR1W-310340

New Dual Encoder TX

- Twin Video encoding in one RF channel
- Two Audio / Video Inputs
- Single simplified controller
- Two separate RF transmitter bands out
- Easy two camera support

Example Scenario 1



Solo4 High Definition Transmitter

HD Video

- HD offers surveillance advantages
  - Higher resolution to 1920x1080p25
  - Progressive and interlaced formats

- Cobham Surveillance product will
  - Maintain quality while reducing data rate, therefore increasing range
  - Offer reduced frame rate HD to fit into narrow bandwidths
  - In future offer HD in to SD transmission out – 'Digital PTZ' for longer range transmission.
  - 10W DC power compact transmitter solution

- We support H.264 (MPEG-4 AVC).
- Decoded using external module attached to our Pro-RX
- **Integral HD decoder now in Pro-Rx**

Product Shipping Now

VETA Miniature Transmitter (VMT)

- **Applications**
  - High Security Audio/video Surveillance
    - Concealments
    - Body worn
  - UAS/UGV
- **Key System Features**
  - COFDM Modulation Narrowband & DVB-T
  - Very Small (2 cu-inches)
  - Low Power Consumption ~ 4 Watts
  - Low End to End System Latency (~44 mS)
  - Output Frequency: L, S and C-band (No UHF)
  - Built-in MPEG-2/*4 (H.263)Encoder
  - SDI input Option
  - Secure – ABS/ *AES 128/256 Encryption
    - *Note: Optional
  - Companion 2W Amplifier in S and C

High L, S-Band and C-Band

- NTSC & PAL
- Composite & S-Video Inputs
- User Data

DropCam3G
Combined COFDM and 3G Transmitter

COBHAM

Features

- COFDM, 3G (2.5G) modem, battery and camera in one package.
- Medium range coverage using COFDM.
- Long range coverage at reduced frame rate using 3G.
- Reverse Control (Camera PTZ, frequency, AES key, power on/off) using 3G modem.
- Range of cameras, cameras can be connected directly or abstracted on cable. Cameras can be PTZ.
- High Resolution stills capture. (Future)
- GPS video burn in for evidence (MJPEG only)
- Trigger sensing inputs.
- Trigger action intelligence, pan camera, power on, capture still, send text message etc.
- Played using 'Mission Commander' software player.
- Supports multiple camera languages.

Demo today

DropCam3G

Complete Managed Surveillance Solution

Pan Tilt Zoom Pinhole Camera (CAMPTZP)

- Low light PAL / NTSC pinhole camera

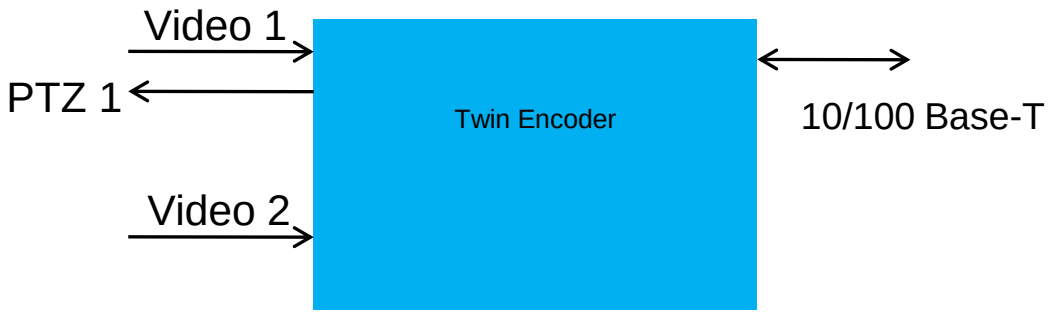
- Variable 2.5mm – 10mm focal length
- Unique gearing allows as small as a 2mm hole
- Almost silent during operation
- Ideal for covert hides / street furniture

- Allows recognition at 15m range
- Uses include
    - Large rooms
    - Doorways
    - Parking lots

- Control with camera presets
- Direct coupling to
    - Dropcam
    - Netnode

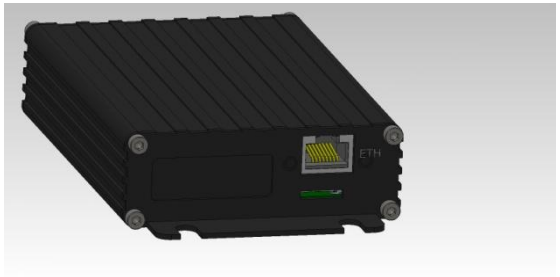
IP Encoder (NETENC)

- New Two channel IP Encoder
  - Solo4 sized
  - PTZ control



- Integrated into Mission Commander
- Web Interface Control and setup
- Support multiple Streaming protocols with **AES**
- **Twin SD** or **single HD** video
- Low latency and excellent low bit-rate performance

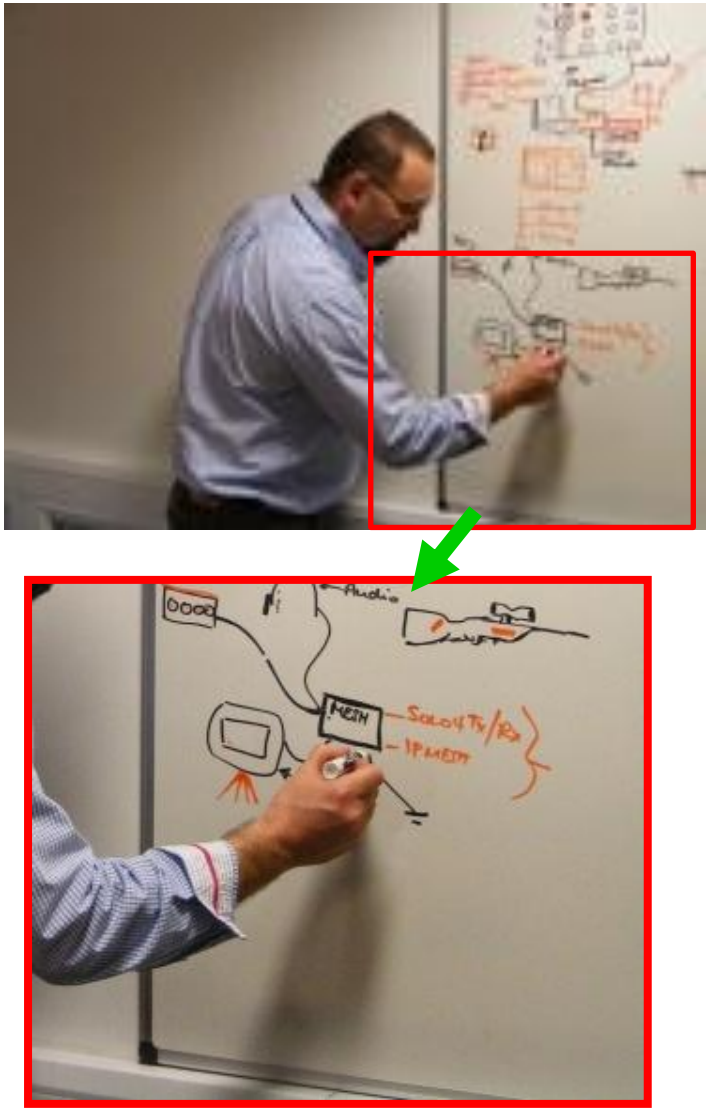
- Low power (approx 6W confirmed SD Mode 1 video)
- Dual SD H.264 Video streams 9W



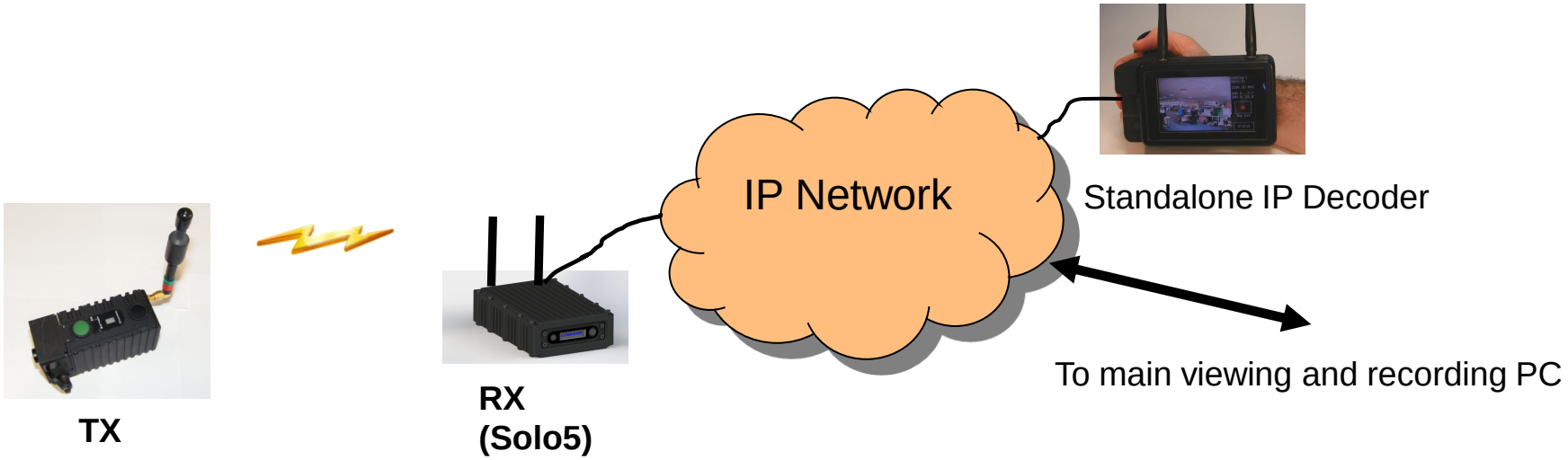
Production units Now

NETENC Continued

- Already supports single HD MPEG-4 AVC H.264
- Already supports dual SD MPEG-4 AVC
- Working on Dual MPEG-4 ASP –**UVMS compatible**
- Will record onto 32GB SD card
- Streaming modes
  - Multicast all of the above (RTSP & UDP)
  - Unicast all of the above (RTSP)
  - Mix of Multicast & Unicast possible
  - Full MPEG-TS
- Twin Video example



New IP Decoder



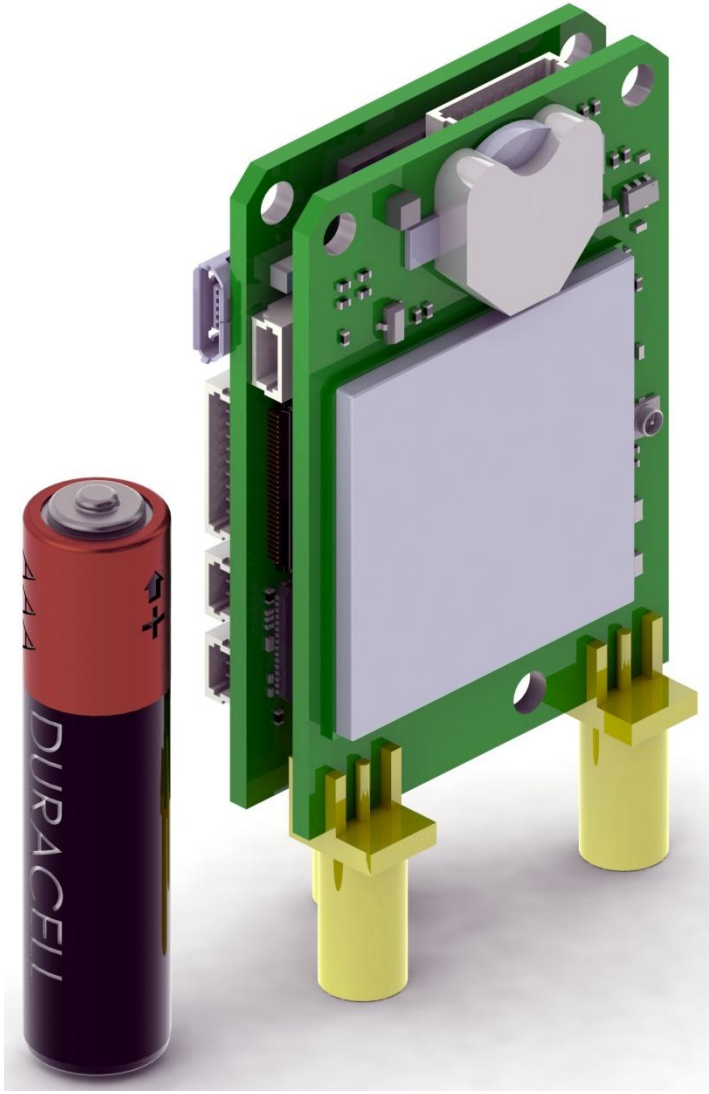
- Software and Licence update to standard NanoVue
- Supports decoding of UDP Multicast today
- Provides decoding to the inbuilt OLED or to a PAL output
- Local verification of streaming

New IP Decoder - Applications

- Standard COFDM Systems
  - Use as standalone IP Hardware decoder to view on a monitor
  - Use as a field tool to verify streaming locally instead of a PC
  - AES decryption in unit – enables you to view pictures locally
- Mesh systems
  - Use as a field tool to verify locally encoded video from a Mesh Node
  - Built into Mesh Viewer (MicroVue 2 case)

Next Generation IP Module - 1

- The next generation Cobham IP module covers most of the current wired and wireless IP standards
- The module comprises two PCBs: D812 and D813 although the PCBs can also be used independently
- The D812 features a powerful but low power ARM processor, plus the following interfaces:
  - Ethernet
  - Wi-Fi
  - Bluetooth
  - MicroSD card
  - USB
- The D813 provides 3G/3.5G data connectivity, as well as a high sensitivity GPS receiver
- A compatible 4G module is planned for 2013



Next Generation IP Module - 2

- The first application for the new IP module will be a 3.5G Full HD Streamer
- Demo units available late Q3 2012
- One HD or two SD channels
- Dual SIM capability
- Internal hard disk recording
- Trigger inputs
- Low power Standby
- Power: about 10W in full HD mode with 3G active

Typical Nugget Deployment
160 to 190MHz to be demo'd today

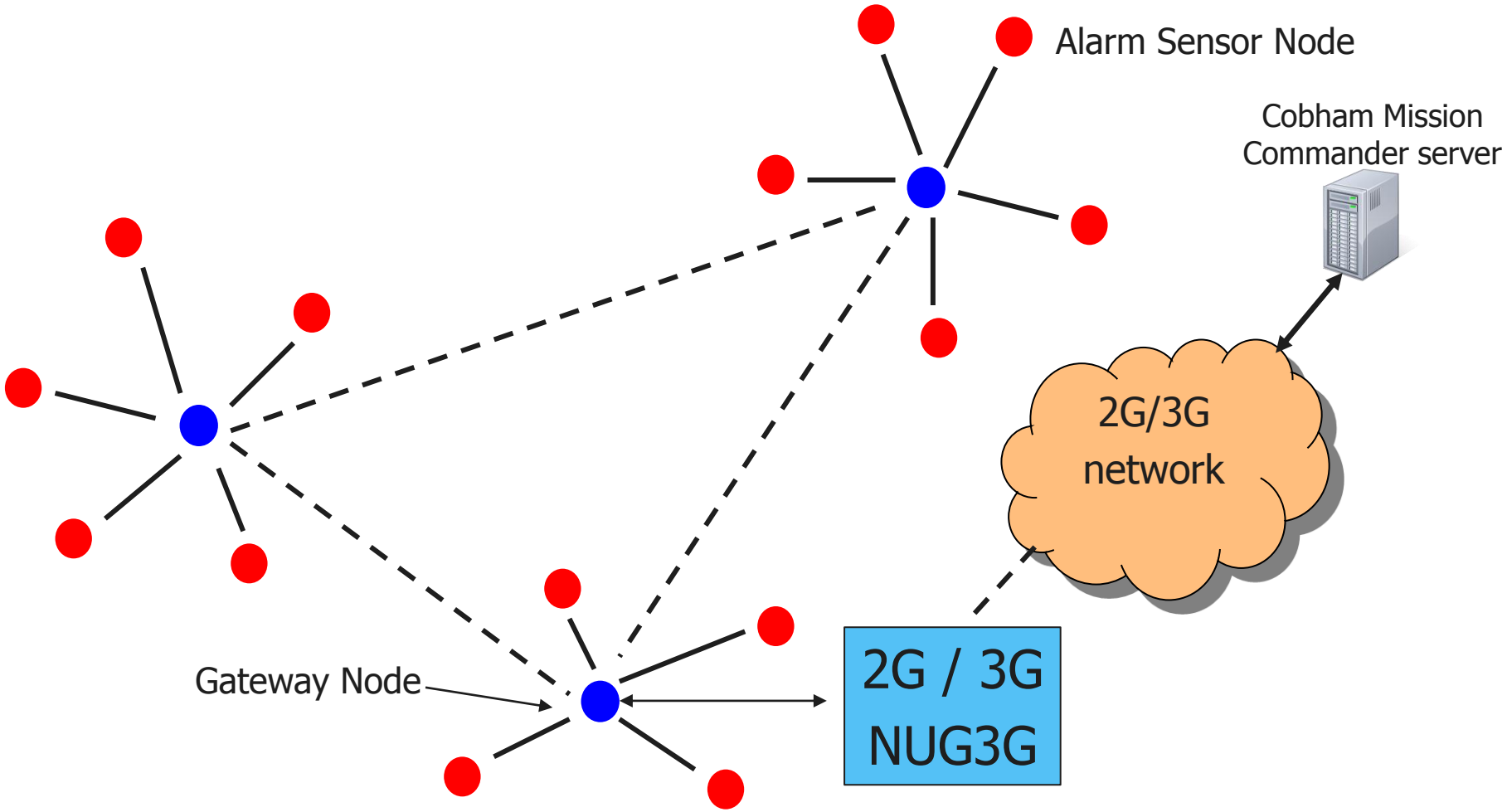
Destination Nugget

Alarm appears on map

Laptop with Mission Commander software

•Click to produce alarm

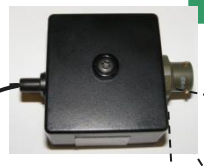
Gateway Nodes can be defined



Ancillary Devices – making Nuggets work!

- Enables use of existing UGS sensors within the new network of sensors
- Single cable connection to Nugget
- Detects sensor connected and self configures
- 1 sensor per RGS IF, 2 RGS IF per Nugget

Nugget



RGS
I/F

Long Range PIR

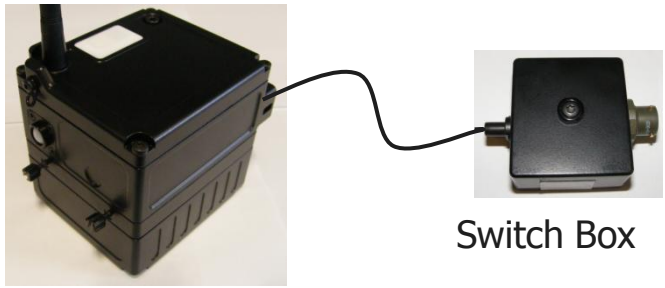
Geophone (Seismic)

Trip wire

Magnetic

Ancillary Devices – Switching other devices

- 4 Bi-directional configurable I/O connections
- Single cable connection to Nugget
- Can easily connect up to four devices to be powered or monitored, such as:



Nugget

Switch Box

Ability to connect an external Battery for longer deployment.

Commercial Sensors

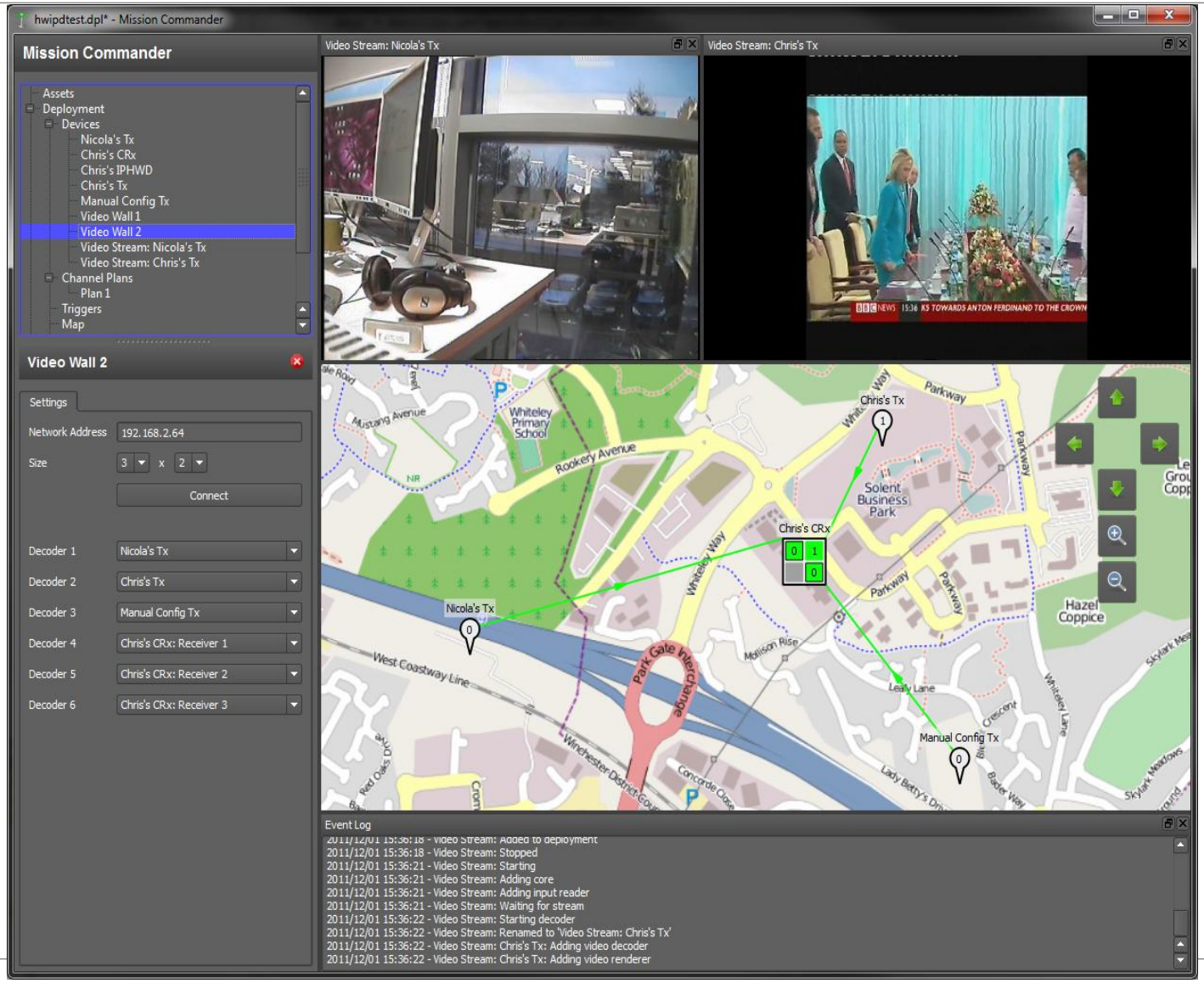
Door sensors

Security Cameras

Sirens / Horns

Security Lighting

Integrated Surveillance Infrastructure Systems: Mission Commander



Integrated Surveillance Infrastructure Systems: Mission Commander Today

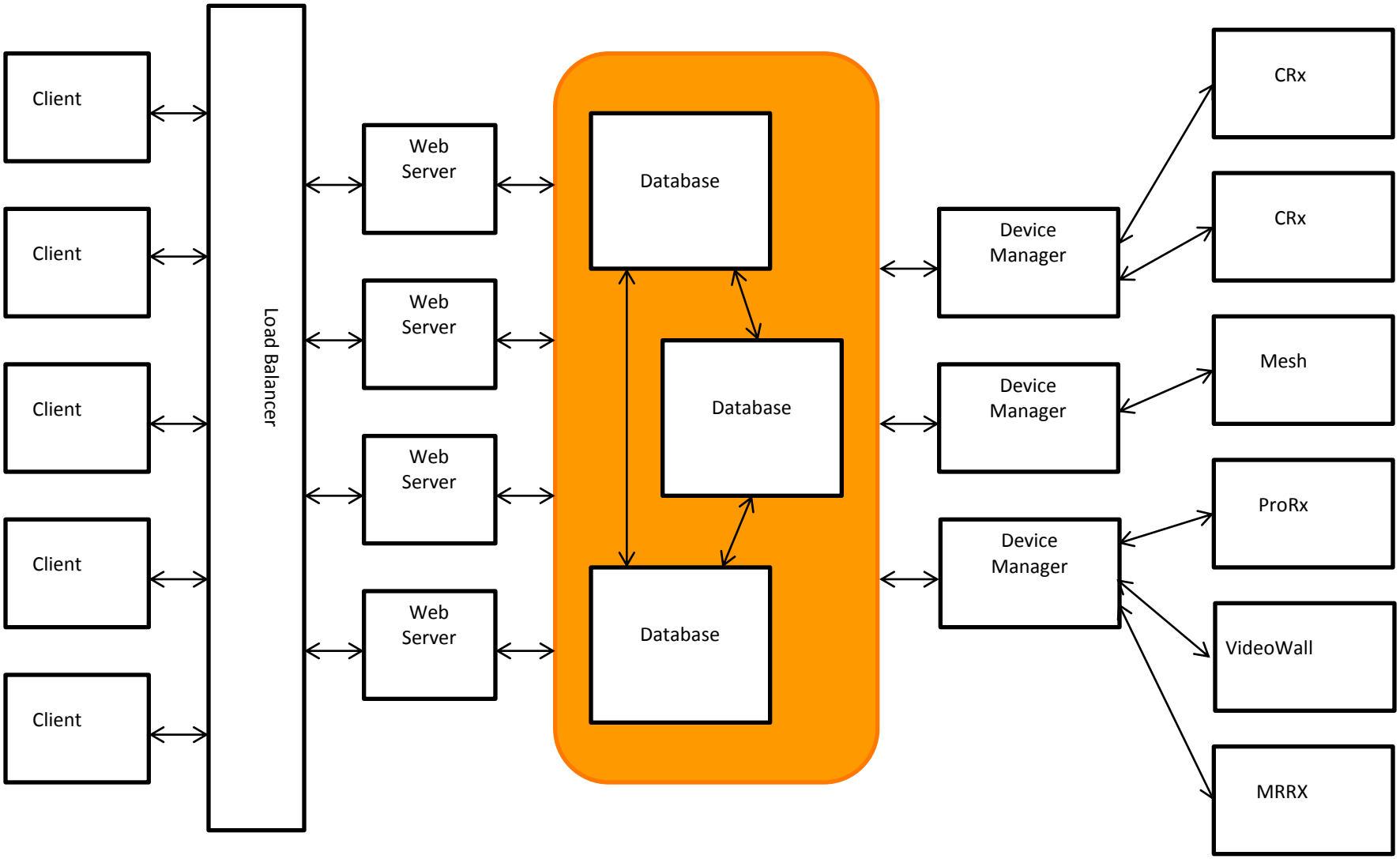
- Provides Easy to use Mapping and graphical network view
- Live video support – MPEG-2 and MPEG-4 (H.263 & H.264)
- Live diagnosis / highlight of error conditions
- Integrated with the Field Controller

- Logging all actions – traceability and Mission review
- Managing encryption keys with a key management tool with Cryptowizard
- Enables easier frequency management

Integrated Surveillance Infrastructure Systems: Mission Commander in progress

- Client Server Split – supporting redundant servers & multiple clients **DONE – 1st release**
- Manage Mesh handover between cells (already supported in standard COFDM)
- Recording of link conditions in the map – provide a coverage predictor
- Asset management register
- Inclusion of audio surveillance products, including next-gen solutions based on 3G/4G

Client / Server Architecture
Mission Commander Phase 3



Network Video Storage Compatibility

- Milestone Compatibility
  - Internal MPEG-4 encoder
  - First release is video only
  - Follow up with PTZ camera support
  - Allow very compact and power efficient integration of standard composite PTZ cameras with Mesh Nodes
  - Considering Milestone support from within Mission Commander
- UVMS Compatibility
  - Including Low Latency Mode